REMARKS/ARGUMENTS

Claims 1-20 are pending in the present application. Claims 1, 3, 5, 8, 10, 11, 16, 18 and 19 are amended. Claim 9 is canceled.

Claim Rejections – 35 U.S.C. § 102

To anticipate a claim under 35 U.S.C. § 102 a single prior art reference must contain and/or teach each and every element of the claim. See MPEP § 2131 and Lewmar Marine Inc. v. Barient, Inc., 627 F.2d 744, 747, 3 USPQ2d 1766, 1768 (Fed. Cir. 1987), cert. denied, 484 U.S. 1007 (1988). A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Verdegaal Bros. v. Union Oil Co. of California, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Moreover, the single prior art reference must disclose all of the claimed elements **"arranged as in the claim."** (emphasis added) Structural Rubber Prods. Co. v. Park Rubber Co., 749 F.2d 707, 716, 223 USPQ 1264, 1271 (Fed. Cir. 1984). Moreover, **"[t]he identical invention must be shown in as complete detail as is contained in the ... claim."** (emphasis added) Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ1913, 1920 (Fed. Cir. 1989). Missing elements may not be supplied by the knowledge of one skilled in the art or the disclosure of another prior art reference. Titanium Metals Corp. v. Banner, 778 F.2d 775, 780, 227 USPQ 773, 777 (Fed. Cir. 1985).

Claims 1, 2, 9, 11, 12, 14 and 15 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,541,927 to Yamashita. Applicant respectfully traverses this rejection. The Yamashita reference does not anticipate claims 1, 2, 9, 11, 12, 14 and 15, because the Yamashita reference fails to teach or suggest all of the elements of these claims.

The claims are directed to suppressing overvoltage transients in an X-ray tube. Overvoltage in an X-ray tube can lead to "insulation breakdown", "instable or uncontrollable high voltage regulation", and repeated transient overvoltage can cause an "X-ray system" to become inoperative. See paragraphs 4-7 of the present application.

Transient overvoltage in an X-ray tube originates from (a) voltage differences between the high voltage at the vacuum gap and the much lower voltage across the driving circuit, (b) floating high voltage structures, (c) discharges caused by insulator surface contamination, and (d) filament shorting at the cathode. See paragraphs 3-4 of the present application.

The Yamashita reference discloses a system and method of adjusting the driving conditions (bias voltages) for a color cathode ray tube used as a computer monitor. It has nothing to do with protecting against overvoltage transients in a cathode assembly of an X-ray tube.

In independent claims 1 and 11, the Examiner asserts that the Yamashita reference discloses a cathode circuit for an imaging tube (Figure 1), including: a) a plurality of high voltage elements (12 and Kr) and b) at least one voltage-clamping device (13r) coupled

between the plurality of high voltage elements and preventing the occurrence of overvoltage transients in the cathode circuit (col. 5, lines 15-28). Applicant disagrees with this assessment. The Yamashita reference does not discloses a cathode circuit for an imaging tube. In contrast, the Yamashita reference discloses "an exemplary configuration of a color cathode ray tube" in Figure 1 as stated in column 2, lines 9-11. In addition, the video amplifying circuit 12 disclosed in the Yamashita reference is not a high voltage element. As specified in column 3, lines 43-62 and column 5, lines 15-28, a color video signal and a synchronization signal are supplied to video amplifying circuit 12, and video signals of the three primary colors (RGB) formed in the video amplifying circuit 12 are supplied to cathodes Kr, Kg and Kb respectively via clamp circuits 13r, 13g and 13b. The voltages formed in the voltage formation circuit 21 are supplied to clamp circuits 13r, 13g and 13b to implement the adjustments on the cutoff voltages Ekco of the respective cathodes Kr, Kg and Kb. The clamp circuits 13r, 13g and 13b in the Yamashita reference are not voltage-clamping devices to protect against overvoltage transients in a cathode assembly of an X-ray tube. They are used to combine the video signals of the three primary colors (RGB) formed in the video amplifying circuit 12 with the cutoff voltages Ekco (R), Ekco (G) and Ecko (B) from the voltage formation circuit 21. In other words, the purpose of clamp circuits 13r, 13g and 13b is not to prevent the occurrence of overvoltage transients in a cathode circuit.

Claims 1 and 11 are amended to include at least one voltage-clamping device coupled between each pair of the plurality of high voltage elements to prevent the occurrence of overvoltage transients in the cathode circuit for an imaging tube.

The Examiner states in his allowance of claim 20 in a previous Office Action that the prior art neither teaches nor reasonably suggests an imaging tube having a plurality of voltage clamping devices coupled to first and second sets of high voltage elements that prevent the occurrence of overvoltage transients across the first and second sets of high voltage elements.

Claim 2 is a dependent claim, dependent upon independent claim 1, and thus should be allowable for the above reasons as well as for the additional elements it contains. Claim 9 is canceled.

Claims 12, 14 and 15 are dependent claims, dependent upon independent claim 11, and thus should be allowable for the above reasons as well as for the additional elements they contain.

Since the Yamashita reference does not disclose at least one voltage-clamping device coupled between each pair of the plurality of high voltage elements to prevent the occurrence of overvoltage transients in the cathode circuit for an imaging tube, the rejection of claims 1, 2, 11, 12, 14 and 15 should be withdrawn.

The Applicant believes that claims 1, 2, 11, 12, 14 and 15 contain patentable subject matter and are in condition for allowance. Withdrawal of the rejection under 35 U.S.C. § 102(b) and allowance of claims 1, 2, 11, 12, 14 and 15 are respectfully requested.

Claims 1, 2, 6, 7 and 9-18 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,995,069 to Tanaka. Applicant respectfully traverses this rejection. The

Tanaka reference does not anticipate claims 1, 2, 6, 7 and 9-18, because the Tanaka reference fails to teach or suggest all of the elements of these claims.

The Tanaka reference discloses an X-ray tube with a protective resistor 72b coupled between one end of a cathode filament 23b and a cathode terminal 70. The protective resistor 72b limits short circuit current which may flow when an abnormal discharge takes place in the X-ray tube. As disclosed, the resistor limits current flow when a short circuit takes place. The resistor is a current device, while the claimed invention calls for a "voltage-clamping device."

The rejection is improper because the claims require a voltage-clamping device to be coupled between each pair of the plurality of high voltage elements. The Taznaka reference does not disclose coupling a voltage-clamping device between each pair of a plurality of high voltage elements. In fact, the resistor 72(b) is coupled between a voltage and ground (zero voltage), which teaches away from Applicant's invention. In addition, the Tanaka reference does not disclose or suggest preventing overvoltage transients in an imaging tube.

Claims 1 and 11 are amended to include at least one voltage-clamping device coupled between each pair of the plurality of high voltage elements to prevent the occurrence of overvoltage transients in the cathode circuit for an imaging tube.

The Examiner states in his allowance of claim 20 in a previous Office Action that the prior art neither teaches nor reasonably suggests an imaging tube having a plurality of voltage

clamping devices coupled to first and second sets of high voltage elements that prevent the occurrence of overvoltage transients across the first and second sets of high voltage elements.

Claims 6, 7 and 10 are dependent claims, dependent upon independent claim 1, and thus should be allowable for the above reasons as well as for the additional elements they contain. Claim 9 is canceled.

Claims 12-18 are dependent claims, dependent upon independent claim 11, and thus should be allowable for the above reasons as well as for the additional elements they contain.

Since the Tanaka reference does not disclose a voltage-clamping device, or at least one voltage-clamping device coupled between each pair of the plurality of high voltage elements to prevent the occurrence of overvoltage transients in the cathode circuit for an imaging tube, the rejection of claims 1, 2, 6, 7 and 10-18 should be withdrawn.

The Applicant believes that claims 1, 2, 6, 7 and 10-18 contain patentable subject matter and are in condition for allowance. Withdrawal of the rejection under 35 U.S.C. § 102(b) and allowance of claims 1, 2, 6, 7 and 10-18 are respectfully requested.

Claims 1, 3, 4, 6, 7, 9-11 and 14-18 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,132,999 to Wirth. Applicant respectfully traverses this rejection. The Wirth reference does not anticipate claims 1, 2, 6, 7 and 9-18, because the Wirth reference fails to teach or suggest all of the elements of these claims.

The Wirth reference discloses a metal oxide varistor 59 connected between a cathode 49 and a grounded casing 55. This is a voltage limiting device providing shunt paths to

ground when the voltage across the cathode exceeds the normal operating voltage by a defined amount.

The rejection is improper because the claims require a voltage-clamping device to be coupled between each pair of the plurality of high voltage elements. The Wirth reference does not disclose coupling a voltage-clamping device between each pair of a plurality of high voltage elements. In fact, the metal oxide varistor 59 is coupled between a voltage (cathode 49) and ground (grounded casing 55), which teaches away from Applicant's invention.

Claims 1 and 11 are amended to include at least one voltage-clamping device coupled between each pair of the plurality of high voltage elements to prevent the occurrence of overvoltage transients in the cathode circuit for an imaging tube.

The Examiner states in his allowance of claim 20 in a previous Office Action that the prior art neither teaches nor reasonably suggests an imaging tube having a plurality of voltage clamping devices coupled to first and second sets of high voltage elements that prevent the occurrence of overvoltage transients across the first and second sets of high voltage elements.

Claims 3, 4, 6, 7 and 10 are dependent claims, dependent upon independent claim 1, and thus should be allowable for the above reasons as well as for the additional elements they contain. Claim 9 is canceled.

Claims 14-18 are dependent claims, dependent upon independent claim 11, and thus should be allowable for the above reasons as well as for the additional elements they contain.

Since the Wirth reference does not disclose at least one voltage-clamping device coupled between each pair of the plurality of high voltage elements to prevent the occurrence of overvoltage transients in the cathode circuit for an imaging tube, the rejection of claims 1, 3, 4, 6, 7, 10, 11 and 14-18 should be withdrawn.

The Applicant believes that claims 1, 3, 4, 6, 7, 10, 11 and 14-18 contain patentable subject matter and are in condition for allowance. Withdrawal of the rejection under 35 U.S.C. § 102(b) and allowance of claims 1, 3, 4, 6, 7, 10, 11 and 14-18 are respectfully requested.

Claims 1, 6, 7, 9-11 and 15-19 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 2,524,240 to Titterton et al. Applicant respectfully traverses this rejection. The Titterton et al. reference does not anticipate claims 1, 6, 7, 9-11 and 15-19, because the Titterton et al. reference fails to teach or suggest all of the elements of these claims.

The Titterton et al. reference discloses an X-ray tube 24 with a resistor coupled across the cathode 22 and the anode 23. However, the resistor is a current device, while the claimed invention calls for a "voltage-clamping device." In addition, the Titterton et al. reference discloses a gap 40 coupled between a voltage multiplier 7 and the cathode 22.

The rejection is improper because the claims require a voltage-clamping device to be coupled between each pair of the plurality of high voltage elements. The Titterton et al. reference does not disclose coupling a voltage-clamping device between each pair of a

plurality of high voltage elements. In fact, the resistor is coupled across the cathode 22 and the anode 23, which teaches away from Applicant's invention. In addition, the Titterton et al. reference does not disclose or suggest preventing overvoltage transients in an imaging tube.

Claims 1, 11 and 19 are amended to include at least one voltage-clamping device coupled between each pair of the plurality of high voltage elements to prevent the occurrence of overvoltage transients in the cathode circuit for an imaging tube.

The Examiner states in his allowance of claim 20 in a previous Office Action that the prior art neither teaches nor reasonably suggests an imaging tube having a plurality of voltage clamping devices coupled to first and second sets of high voltage elements that prevent the occurrence of overvoltage transients across the first and second sets of high voltage elements.

Claims 6, 7 and 10 are dependent claims, dependent upon independent claim 1, and thus should be allowable for the above reasons as well as for the additional elements they contain. Claim 9 is canceled.

Claims 15-18 are dependent claims, dependent upon independent claim 11, and thus should be allowable for the above reasons as well as for the additional elements they contain.

Since the Titterton et al. reference does not disclose a voltage-clamping device, or at least one voltage-clamping device coupled between each pair of the plurality of high voltage elements to prevent the occurrence of overvoltage transients in the cathode circuit for an imaging tube, the rejection of claims 1, 6, 7, 10, 11 and 15-19 should be withdrawn.

The Applicant believes that claims 1, 6, 7, 10, 11 and 15-19 contain patentable subject matter and are in condition for allowance. Withdrawal of the rejection under 35 U.S.C. § 102(b) and allowance of claims 1, 6, 7, 10, 11 and 15-19 are respectfully requested.

Allowable Subject Matter

Claim 20 is allowed for reasons as stated in the previous Office Action dated September 22, 2006. The Applicant gratefully acknowledges and appreciates the Examiner's allowance of claim 20.

Claims 5 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 5 and 8 are rewritten in independent form including all of the limitations of the base claim and any intervening claims. Therefore, claims 5 and 8 should now be in condition for allowance.

Conclusion

In view of the amendments and remarks/arguments presented above, the Applicant believes that the application is now in condition for allowance, and respectfully requests reconsideration of the application, withdrawal of the rejections, and allowance of the claims. The Applicant respectfully requests that the Examiner telephone the undersigned in the event a telephone conference would be helpful in advancing prosecution of the application towards allowance.

The Commissioner is hereby authorized to charge any additional fees, which may be required in this application to Deposit Account No. 070845. If any extensions of time are needed for timely acceptance of papers submitted herewith, the Applicant hereby petitions for such extension under 37 C.F.R. § 1.136 and authorizes payment of any such extension fees to Deposit Account No. 070845.

Respectfully submitted,

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